

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-29 (Cancelled).

Claim 30. (Currently Amended).

An intravenous oxygenator for enriching blood with oxygen, said oxygenator having a twisted bundle of fibers allowing through flow of oxygen and carbon dioxide therealong, said fibers being each connected to a gas supply means through a first connection and to a gas evacuation means through a second connection so that oxygen and carbon dioxide are allowed to flow through the fibers from the first connections to the second connections,

the fiber bundle being twisted by relative rotation of the first connections of the fibers relative to the second connections of the fibers about a longitudinal axis of the oxygenator,

~~wherein a neighboring bundle of fibers, which is disposed in series with the bundle of fibers along the oxygenator, is twisted in the same direction.~~

wherein the oxygenator comprises a neighboring bundle of fibers, which is axially disposed in series along the longitudinal axis of the oxygenator, the bundles of fibers each

having individual connection pairs, and both bundles of fibers being twisted in the same direction.

Claim 31. (Previously Presented).

The intravenous oxygenator as set forth in claim 30,
wherein the connections are relatively rotated from 90° to 300°, preferably from 150° to 270°, more preferably about 240°, per 30 mm fiber length.

Claim 32. (Previously Presented).

The intravenous oxygenator as set forth in claim 30,
wherein at least a multiplicity, preferably at least a plurality, of the fibers are inclined, in their extension between the connections, at an angle of from 30° to 75°, preferably of from 42° to 71°, particularly of about 62°, to the longitudinal axis if the longitudinal axis and the fiber orientation are projected onto a projection cylinder that is coaxial with the longitudinal axis.

Claim 33. (Previously Presented).

The intravenous oxygenator as set forth in claim 32,
wherein the fibers are in the angular range mentioned over a major part of their length.

Claim 34. (Previously Presented).

The intravenous oxygenator as set forth in claim 30,
wherein the twisted bundle of fibers rests against an impermeable sheathing on the outside thereof.

Claim 35. (Previously Presented).

The intravenous oxygenator as set forth in claim 30,
wherein the twisted bundle of fibers has a diameter of from 15 to 30 mm, preferably from 15 to 25 mm.

Claim 36. (Previously Presented).

The intravenous oxygenator as set forth in claim 30,
wherein the connections of the twisted bundle of fibers are secured against untwisting themselves.

Claim 37. (Previously Presented).

The intravenous oxygenator as set forth in claim 30,
comprising means for limiting further relative rotation of the connections of the twisted bundle of fibers.

Claim 38. (Previously Presented).

The intravenous oxygenator as set forth in claim 36,
wherein securement or limitation may be achieved by providing a frictional connection between a first fiber holder

and a second fiber holder, with said fiber holders being connected to the connections.

Claim 39. (Withdrawn).

An intravenous oxygenator for insertion into a vein having a bundle of fibers allowing through flow of oxygen and carbon dioxide therealong, said fibers being each connected to a gas supply means through a first connection and to a gas evacuation means through a second connection so that oxygen and carbon dioxide are allowed to flow through the fibers from the first connections to the second connections, said connections being respectively connected to a first and to a second fiber holder and being displaceable along a longitudinal axis of the oxygenator,

wherein the fiber holders are sliding bodies that are rotatable relative to one another about the longitudinal axis of the oxygenator, more specifically relative to the central catheter, and that are mounted so as to be displaceable preferably along said axis.

Claim 40. (Withdrawn).

The intravenous oxygenator as set forth in claim 39,
comprising a first driver provided on the first fiber holder and a second driver provided on the second fiber holder, said

drivers being directed toward each other and allowing rotation of the first fiber holder relative to the second fiber holder at least in one direction of rotation up to a rotation limit only without the second fiber holder being carried along when the two fiber holders are pressed into contact with each other.

Claim 41. (Withdrawn).

The intravenous oxygenator as set forth in claim 40,
wherein the rotation limit is a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 42. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising an abutment device provided on fiber holders for limiting a displacement of the connections relative to one another.

Claim 43. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein fiber holders are disposed in the inner volume of the bundle of fibers.

Claim 44. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a substantially elastic bond between two fiber holders.

Claim 45. (Withdrawn).

The intravenous oxygenator as set forth in claim 44,
wherein the elastic bond comprises a membrane and/or a linear spring.

Claim 46. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a spiral guidance means for guiding fiber holders along the longitudinal axis of the oxygenator.

Claim 47. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a blood pump for pumping blood through the bundle of fibers.

Claim 48. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein, when the bundle of fibers is twisted, there is

equilibrium of moments between the fibers and the force-transmitting bonds between the connections.

Claim 49. (Withdrawn).

The intravenous oxygenator as set forth in claim 48,

wherein it is assumed that the equilibrium of moments is achieved with a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 50. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,

comprising a housing with an impermeable sheathing that is deformable in the radial direction in particular.

Claim 51. (Withdrawn).

The intravenous oxygenator as set forth in claim 50,

wherein the housing can expand to a diameter of 30 mm at the most, more specifically of 25 mm at the most.

Claim 52. (Withdrawn).

The intravenous oxygenator as set forth in claim 50,

comprising a wire grate used as the carrier structure of the housing.

Claim 53. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a gear connected to a bundle of fibers.

Claim 54. (Withdrawn).

The intravenous oxygenator as set forth in claim 53,
wherein, on a rotation device for twisting a plurality of
fiber bundles connected in series, a gear is provided between the
rotation device and a bundle of fibers in such a manner that the
gear transmits a rotation of the rotation device onto the bundles
of fibers at a ratio corresponding to the number of fiber bundles
or to a ratio of the overall length of the bundles of fibers to a
scale length.

Claim 55. (Withdrawn).

An intravenous oxygenator for insertion into a vein having a
bundle of fibers allowing through flow of oxygen and carbon
dioxide therealong, said fibers being each connected to a gas
supply means through a first connection and to a gas evacuation
means through a second connection so that oxygen and carbon
dioxide are allowed to flow through the fibers from the first
connections to the second connections, said connections being
respectively connected to a first and to a second fiber holder

and being displaceable along a longitudinal axis of the oxygenator,

wherein the fiber holders are mounted so as to be rotatable relative to one another about the longitudinal axis of the oxygenator and to be displaceable preferably along said axis and further comprising a first driver provided on the first fiber holder and a second driver provided on the second fiber holder, said drivers being directed toward each other and allowing rotation of the first fiber holder relative to the second fiber holder at least in one direction of rotation up to a rotation limit only without the second fiber holder being carried along when the two fiber holders are pressed into contact with each other.

Claim 56. (Withdrawn).

The intravenous oxygenator as set forth in claim 55,

wherein the rotation limit is a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 57. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,

comprising an abutment device provided on fiber holders for

limiting a displacement of the connections relative to one another.

Claim 58. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein fiber holders are disposed in the inner volume of the bundle of fibers.

Claim 59. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a substantially elastic bond between two fiber holders.

Claim 60. (Withdrawn).

The intravenous oxygenator as set forth in claim 59,
wherein the elastic bond comprises a membrane and/or a linear spring.

Claim 61. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a spiral guidance means for guiding fiber holders along the longitudinal axis of the oxygenator.

Claim 62. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a blood pump for pumping blood through the bundle of fibers.

Claim 63. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein, when the bundle of fibers is twisted, there is equilibrium of moments between the fibers and the force-transmitting bonds between the connections.

Claim 64. (Withdrawn).

The intravenous oxygenator as set forth in claim 63,
wherein it is assumed that the equilibrium of moments is achieved with a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 65. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a housing with an impermeable sheathing that is deformable in the radial direction in particular.

Claim 66. (Withdrawn).

The intravenous oxygenator as set forth in claim 65,
wherein the housing can expand to a diameter of 30 mm at the most, more specifically of 25 mm at the most.

Claim 67. (Withdrawn).

The intravenous oxygenator as set forth in claim 65,
comprising a wire grate used as the carrier structure of the housing.

Claim 68. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a gear connected to a bundle of fibers.

Claim 69. (Withdrawn).

The intravenous oxygenator as set forth in claim 68,
wherein, on a rotation device for twisting a plurality of fiber bundles connected in series, a gear is provided between the rotation device and a bundle of fibers in such a manner that the gear transmits a rotation of the rotation device onto the bundles of fibers at a ratio corresponding to the number of fiber bundles or to a ratio of the overall length of the bundles of fibers to a scale length.

Claim 70. (Withdrawn).

An intravenous oxygenator for insertion into a vein having a bundle of fibers allowing through flow of oxygen and carbon dioxide therealong, said fibers being each connected to a gas supply means through a first connection and to a gas evacuation means through a second connection so that oxygen and carbon dioxide are allowed to flow through the fibers from the first connections to the second connections, said connections being respectively connected to a first and to a second fiber holder and being displaceable along a longitudinal axis of the oxygenator,

wherein the fiber holders are mounted so as to be rotatable relative to one another about the longitudinal axis of the oxygenator and to be displaceable preferably along said axis and further comprising an abutment device provided on fiber holders for limiting displacement of the connections relative to one another.

Claim 71. (Withdrawn).

The intravenous oxygenator as set forth in claim 70,

comprising a first driver provided on the first fiber holder and a second driver provided on the second fiber holder, said drivers being directed toward each other and allowing rotation of the first fiber holder relative to the second fiber holder at

least in one direction of rotation up to a rotation limit only without the second fiber holder being carried along when the two fiber holders are pressed into contact with each other.

Claim 72. (Withdrawn).

The intravenous oxygenator as set forth in claim 71,
wherein the rotation limit is a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 73. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein fiber holders are disposed in the inner volume of the bundle of fibers.

Claim 74. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a substantially elastic bond between two fiber holders.

Claim 75. (Withdrawn).

The intravenous oxygenator as set forth in claim 74,

wherein the elastic bond comprises a membrane and/or a linear spring.

Claim 76. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a spiral guidance means for guiding fiber holders along the longitudinal axis of the oxygenator.

Claim 77. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a blood pump for pumping blood through the bundle of fibers.

Claim 78. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein, when the bundle of fibers is twisted, there is equilibrium of moments between the fibers and the force-transmitting bonds between the connections.

Claim 79. (Withdrawn).

The intravenous oxygenator as set forth in claim 78,
wherein it is assumed that the equilibrium of moments is achieved with a relative rotation of from 90° to 300°, preferably

of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 80. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a housing with an impermeable sheathing that is deformable in the radial direction in particular.

Claim 81. (Withdrawn).

The intravenous oxygenator as set forth in claim 80,
wherein the housing can expand to a diameter of 30 mm at the most, more specifically of 25 mm at the most.

Claim 82. (Withdrawn).

The intravenous oxygenator as set forth in claim 80,
comprising a wire grate used as the carrier structure of the housing.

Claim 83. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a gear connected to a bundle of fibers.

Claim 84. (Withdrawn).

The intravenous oxygenator as set forth in claim 83;

wherein, on a rotation device for twisting a plurality of fiber bundles connected in series, a gear is provided between the rotation device and a bundle of fibers in such a manner that the gear transmits a rotation of the rotation device onto the bundles of fibers at a ratio corresponding to the number of fiber bundles or to a ratio of the overall length of the bundles of fibers to a scale length.

Claim 85. (Withdrawn).

An intravenous oxygenator for insertion into a vein having a bundle of fibers allowing through flow of oxygen and carbon dioxide therealong, said fibers being each connected to a gas supply means through a first connection and to a gas evacuation means through a second connection so that oxygen and carbon dioxide are allowed to flow through the fibers from the first connections to the second connections, said connections being respectively connected to a first and to a second fiber holder and being displaceable along a longitudinal axis of the oxygenator,

wherein the fiber holders are mounted so as to be rotatable relative to one another about the longitudinal axis of the oxygenator and to be displaceable preferably along said axis and

further comprising a spiral guidance means for guiding fiber holders along the longitudinal axis of the oxygenator.

Claim 86. (Withdrawn).

The intravenous oxygenator as set forth in claim 85,

comprising a first driver provided on the first fiber holder and a second driver provided on the second fiber holder, said drivers being directed toward each other and allowing rotation of the first fiber holder relative to the second fiber holder at least in one direction of rotation up to a rotation limit only without the second fiber holder being carried along when the two fiber holders are pressed into contact with each other.

Claim 87. (Withdrawn).

The intravenous oxygenator as set forth in claim 86,

wherein the rotation limit is a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 88. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,

comprising an abutment device provided on fiber holders for

limiting a displacement of the connections relative to one another.

Claim 89. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein fiber holders are disposed in the inner volume of the bundle of fibers.

Claim 90. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a substantially elastic bond between two fiber holders.

Claim 91. (Withdrawn).

The intravenous oxygenator as set forth in claim 88,
wherein the elastic bond comprises a membrane and/or a linear spring.

Claim 92. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a blood pump for pumping blood through the bundle of fibers.

Claim 93. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein, when the bundle of fibers is twisted, there is equilibrium of moments between the fibers and the force-transmitting bonds between the connections.

Claim 94. (Withdrawn).

The intravenous oxygenator as set forth in claim 93,
wherein it is assumed that the equilibrium of moments is achieved with a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 95. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a housing with an impermeable sheathing that is deformable in the radial direction in particular.

Claim 96. (Withdrawn).

The intravenous oxygenator as set forth in claim 95,
wherein the housing can expand to a diameter of 30 mm at the most, more specifically of 25 mm at the most.

Claim 97. (Withdrawn).

The intravenous oxygenator as set forth in claim 95,
comprising a wire grate used as the carrier structure of the housing.

Claim 98. (Withdrawn).

The intravenous oxygenator, more specifically as set forth in claim 30,

comprising a gear connected to a bundle of fibers.

Claim 99. (Withdrawn)

The intravenous oxygenator as set forth in claim 98,

wherein, on a rotation device for twisting a plurality of fiber bundles connected in series, a gear is provided between the rotation device and a bundle of fibers in such a manner that the gear transmits a rotation of the rotation device onto the bundles of fibers at a ratio corresponding to the number of fiber bundles or to a ratio of the overall length of the bundles of fibers to a scale length.

Claim 100. (Withdrawn).

An intravenous oxygenator for insertion into a vein having a bundle of fibers allowing through flow of oxygen and carbon dioxide therealong, said fibers being each connected to a gas

supply means through a first connection and to a gas evacuation means through a second connection so that oxygen and carbon dioxide are allowed to flow through the fibers from the first connections to the second connections, said connections being respectively connected to a first and to a second fiber holder and being displaceable along a longitudinal axis of the oxygenator,

wherein the fiber holders are mounted so as to be rotatable relative to one another about the longitudinal axis of the oxygenator and to be displaceable preferably along said axis and further comprising a housing with an impermeable sheathing that is deformable in the radial direction in particular.

Claim 101. (Withdrawn).

The intravenous oxygenator as set forth in claim 100,

comprising a first driver provided on the first fiber holder and a second driver provided on the second fiber holder, said drivers being directed toward each other and allowing rotation of the first fiber holder relative to the second fiber holder at least in one direction of rotation up to a rotation limit only without the second fiber holder being carried along when the two fiber holders are pressed into contact with each other.

Claim 102. (Withdrawn).

The intravenous oxygenator as set forth in claim 101,

wherein the rotation limit is a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 103. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,

comprising an abutment device provided on fiber holders for limiting a displacement of the connections relative to one another.

Claim 104. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,

wherein fiber holders are disposed in the inner volume of the bundle of fibers.

Claim 105. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,

comprising a substantially elastic bond between two fiber holders.

Claim 106. (Withdrawn).

The intravenous oxygenator as set forth in claim 104,
wherein the elastic bond comprises a membrane and/or a linear spring.

Claim 107. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a spiral guidance means for guiding fiber holders along the longitudinal axis of the oxygenator.

Claim 108. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
comprising a blood pump for pumping blood through the bundle of fibers.

Claim 109. (Withdrawn).

The intravenous oxygenator as set forth in claim 30,
wherein, when the bundle of fibers is twisted, there is equilibrium of moments between the fibers and the force-transmitting bonds between the connections.

Claim 110. (Withdrawn).

The intravenous oxygenator as set forth in claim 109,
wherein it is assumed that the equilibrium of moments is

achieved with a relative rotation of from 90° to 300°, preferably of from 150° to 270°, particularly preferred of about 240°, for each 30 mm fiber length between the two fiber holders.

Claim 111. (Withdrawn).

The intravenous oxygenator as set forth in claim 100,
wherein the housing can expand to a diameter of 30 mm at the most, more specifically of 25 mm at the most.

Claim 112. (Withdrawn).

The intravenous oxygenator as set forth in claim 110,
comprising a wire grate used as the carrier structure of the housing.

Claim 113. (Withdrawn).

The intravenous oxygenator, as set forth in claim 30,
comprising a gear connected to a bundle of fibers.

Claim 114. (Withdrawn).

The intravenous oxygenator as set forth in claim 113,
wherein, on a rotation device for twisting a plurality of fiber bundles connected in series, a gear is provided between the rotation device and a bundle of fibers in such a manner that the gear transmits a rotation of the rotation device onto the bundles

of fibers at a ratio corresponding to the number of fiber bundles or to a ratio of the overall length of the bundles of fibers to a scale length.

Claim 115. (Withdrawn).

An intravenous oxygenator for enriching blood with oxygen, said oxygenator having a plurality of bundles of fibers allowing through flow of oxygen and carbon dioxide therealong, more specifically as set forth in claim 30, said fibers being each connected to a gas conduit system through a first connection and through a second connection so that oxygen and carbon dioxide are allowed to flow through the fibers from the first connections to the second connections,

comprising a mixing channel allowing through flow of gas therealong between different connections for generating a flow that is parallel to the flow through the fibers.

Claim 116. (Withdrawn).

The intravenous oxygenator as set forth in claim 115,

wherein flow resistances of the fibers and of the mixing channel during passage through the oxygenator effect a volume flow ratio of at least 4:1 (flow in the mixing channel to flow in the fibers).

Claim 117. (Withdrawn).

The intravenous oxygenator as set forth in claim 115,

wherein the mixing channel is an annular channel between a one-lumen catheter and the fibers.